

Frequently Asked Questions Regarding the Responsible Recycling (R2) Standard for Electronics Recyclers and International Requirements for E-waste Trade and Recycling

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In 2013, R2 Solutions (“R2S”) released the updated Responsible Recycling (“R2”) Standard for Electronics Recyclers (“R2:2013 Standard” or “Standard”). A multi-stakeholder group – the R2 Technical Advisory Committee (“TAC”) – developed the R2:2013 Standard through an open, transparent and consensus-based approach in conformance with generally accepted principles for consensus-based standards development. The Standard is administered by R2S, a non-profit organization with a diverse and independent Board of Directors and staff, and became effective July 1, 2013.

This paper provides additional background and responds to frequently asked questions about the Standard and its consistency with the requirements of international agreements, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (“Basel Convention” or “Convention”), that may in some instances govern transboundary movements of certain types of end-of-life electronic equipment destined for recycling.

Overview and Summary

The R2:2013 Standard is fully consistent with the requirements of the Basel Convention, and in many instances mandates practices that exceed current international legal requirements with regard to exports of used electronic equipment for materials recovery or reuse.

- The legal requirements governing the classification, collection and management of used equipment and e-waste are evolving at the national level in many countries and at the global level under various international agreements, such as the Basel Convention.
- In the face of some legal uncertainty with respect to the requirements governing the classification and management of diverse types of used and end-of-life equipment, the R2:2013 Standard requires operators to develop a legal compliance plan to ensure full compliance with all environmental, health, safety, and data security requirements applicable to their operations.
- An R2:2013 electronics recycler must establish and use an Environmental, Health, and Safety Management System (“EHSMS”) that is certified to an accredited management system standard, such as RIOS or a combination of both ISO 14001 and OHSAS 18001.
- Further, the Standard requires that recyclers affirmatively identify and document the legality of all international shipments of end-of-life and untested equipment containing Focus Materials (i.e., materials in end-of-life equipment that warrant special care during

recycling). End-of-life equipment containing Focus Materials are those that would also appear to be at risk of qualifying as hazardous wastes under the laws of some countries.

Taken together, these requirements ensure that R2:2013 certified recyclers have the information and management systems in place to ensure that used equipment is managed responsibly and in compliance with applicable local, national and international legal requirements.

Question: Are the export requirements in the Standard consistent with the Basel Convention’s controls on transboundary movements of hazardous wastes?

Answer: The export requirements of the Standard are fully consistent with international hazardous waste trade laws (e.g., Basel Convention). In the face of evolving national and international requirements, the Standard mandates management approaches, documentation, and assurance mechanisms that will help ensure compliance with national laws implementing the requirements of the Basel Convention.

The Basel Convention has been ratified by 180 countries and requires parties to control and in some instances prohibit transboundary movements of hazardous waste, including certain types of e-waste that qualify as “hazardous wastes” under the Convention.¹ The Convention itself does not apply directly to private actors, such as recyclers, but instead obligates parties to the Convention (governments) to implement the Convention’s requirements through national legislation or other legal measures.

The universe of e-waste that is to be controlled as hazardous waste under the Basel Convention is not well defined and, in many instances, reference to national legislation and testing procedures for determining the presence of hazardous characteristics is required to determine applicable legal requirements.² As a practical matter, governments have exercised some interpretive discretion with respect to defining “waste” and “hazardous waste” to be

¹ Additional information on the Basel Convention, including the text of the Convention, can be found at:

<http://www.basel.int/Home/tabid/2202/mctl/ViewDetails/EventModID/8295/EventID/443/xmid/8052/Default.aspx>

² Under the Convention, wastes that contain hazardous constituents (e.g., lead, cadmium, mercury) listed in Annex I are hazardous, unless they do not possess any of the characteristics contained in Annex III. As noted in Annex III, tests to define referenced hazards do not exist or have not been agreed to under the Convention. As a result, national testing procedures for determining the presence of hazardous characteristics are typically used to assess whether a particular waste is hazardous under the laws of an importing, transit or exporting country. This uncertainty as to which types of wastes are “hazardous” under the Convention is further compounded by the difficulty in applying national testing procedures to whole electronic equipment or components, evolutions in product composition and design, and mixed shipments.

controlled under national implementing legislation, creating some inconsistency in national requirements and uncertainty for recyclers.

In recent years, the parties to the Convention have recognized e-waste as a “priority waste stream” and have taken several steps to clarify the extent to which the Convention applies to certain shipments of end-of-life equipment destined for materials recovery and final disposal. This work is ongoing.

Finally, over the past ten years, the implementation of the EU RoHS Directive and similar national legislation restricting the use of certain hazardous substances in electronics in Asia and North America has reduced or eliminated the use of lead, cadmium, mercury and other targeted substances of concern in electronic products. These mandates, combined with other company design improvements may reduce the amount of e-waste that qualifies as hazardous under the Convention over time.

Question: How do the Focus Materials specified in the R2:2013 Standard compare to the Basel Convention waste listings for e-waste?

Response: The R2:2013 Standard’s requirements for the handling of Focus Materials directs attention to those types of e-wastes that are often regarded as “hazardous wastes” under the Basel Convention.

In anticipation of the entry into force of the “Basel Ban Amendment,” the parties in 1998 adopted two new annexes (waste lists) to the Convention that were intended to further define the universe of hazardous wastes covered by the Convention. The new waste lists were specifically adopted to provide governments (particularly developing countries with limited technical resources) with a practical mechanism for identifying wastes that are likely to qualify as hazardous under the Convention (listed in Annex VIII) and those that are presumptively non-hazardous and outside the Convention’s controls (listed in Annex IX).

- Some types of e-wastes are listed on Annex VIII (presumptively hazardous) and other types, including circuit boards, are listed in Annex IX (presumptively non-hazardous) providing governments with some flexibility in determining the universe of e-waste that should be regarded as hazardous.
- Specifically, Annex VIII provides that e-wastes destined for recycling that contain hazardous components, such as batteries made with lead, cadmium or mercury, mercury switches, CRTs and other activated glass and PCB capacitors should qualify as hazardous wastes, unless the wastes do not exhibit hazardous characteristics.³

³ Consistent with Annex I and III, wastes “contaminated” with listed constituents are also hazardous if the waste exhibits hazardous characteristics. Basel Convention, Annex VIII, Waste Entry A1180 provides: “[w]aste electrical and electronic assemblies of scrap containing components such as accumulators and other batteries included on List A, mercury-switches,

- Electronic equipment or scrap listed in Annex VIII (presumptively hazardous) may be managed as non-hazardous waste if it can be shown that the waste does not exhibit any Annex III hazardous characteristics.
- Electrical or electronic wastes listed in Annex IX are presumptively *non-hazardous* but may nonetheless qualify as hazardous if the wastes exhibit hazardous characteristics.⁴
- In most instances, determining whether a waste exhibits hazardous characteristics requires the application of national testing procedures on a case by case basis, making it difficult to define with precision the scope of end-of-life equipment that is to be regarded as “hazardous waste” under the Convention.

Working in the context of the Convention’s inherent legal and technical ambiguities, the R2:2013 Standard takes a balanced approach by mandating attention to and documentation for the management of Focus Materials.

- The R2:2013 Standard defines Focus Materials as end-of-life electronic equipment that contain:
 - Polychlorinated biphenyls (PCBs)
 - Mercury
 - CRT glass (with some exceptions)
 - Batteries
 - Whole or shredded circuit boards containing lead solder

glass from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annex III”.

⁴ Annex IX of the Convention lists the following e-wastes as presumptively non-hazardous under entry B1110:

Electrical and electronic assemblies:

- Electronic assemblies consisting only of metals or alloys
- Waste electrical and electronic assemblies or scrap (including printed circuit boards) not containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or not contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) or from which these have been removed, to an extent that they do not possess any of the characteristics contained in Annex III (note the related entry on list A A1180)
- Electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse, and not for recycling or final disposal

- The components and substances that would qualify as Focus Materials largely track those components identified as hazardous or of concern in the Basel Annex VIII listing (presumptively hazardous).⁵
- In several important respects, the R2:2013 Standard adopts more detailed obligations that can be read as meeting or exceeding the Basel Convention or national legislation in many countries.
 - The R2:2013 Standard’s broad references to PCBs, mercury, and batteries in the definition of Focus Materials are broader than the component listings identified in the Basel Convention A1180 listing, providing additional certainty for certified recyclers.
 - The R2:2013 Standard removes some of the ambiguity related to the Convention’s non-hazardous waste listing for waste electronics by designating circuit boards containing lead as Focus Materials requiring more stringent management and export controls. (The Convention lists printed circuit boards under the non-hazardous B1180 waste entry in Annex IX – *presumptively non-hazardous*.)
 - The R2:2013 Standard also imposes obligations on recyclers to document the legality of importing or exporting Focus Materials contained in “untested or non-functioning equipment.” As noted further below, untested used equipment destined for repair, refurbishment and reuse is generally viewed as non-waste that is outside the Basel Convention, although this issue is the subject of ongoing discussions among governments.
 - The obligations to assess untested or end-of-life equipment containing Focus Materials applies to shipments for recycling within the OECD area, even though the Basel Convention does not apply to such shipments and OECD countries may not regard some of these materials as wastes subject to stringent regulation.
- More broadly, the R2:2013 Standard mandates that an electronics recycler “comply with all applicable environmental, health and safety . . . legal requirements . . .” This broad obligation to ensure legal compliance includes consideration of differing approaches governments have taken to the classification and control of e-waste shipments, including imports and exports.

In summary, certification to the R2:2013 Standard requires recyclers to document the legality in the importing, exporting and transit countries of any movement of used and end-of-life equipment that is likely to qualify as an A1180 hazardous waste. The R2:2013 Standard’s special attention and obligations for importing and exporting Focus Materials correctly directs

⁵ End-of-life electronic equipment that has undergone safe and effective processing or dismantling to remove Focus Materials, yet still contain de minimis amounts of Focus Materials, are not subject to the R2:2013 Standard’s requirements that are triggered by the presence of Focus Materials.

the attention of recyclers to those materials often regarded as “hazardous wastes” under the Basel Convention. The more general obligation to comply with applicable legal requirements ensures that in those instances where a government may choose to regulate a broader universe of used or end-of-life equipment as hazardous, such requirements are identified and addressed.

Question: How does the R2:2013 Standard address the management of used equipment destined for reuse?

Answer: Recognizing the concerns that have been raised by stakeholders with respect to the mismanagement of used equipment exported for reuse, the R2:2013 Standard goes beyond the requirements of the Basel Convention by mandating new documentation and assurance measures related to the management of equipment destined for reuse and resale.

The R2:2013 Standard’s approach to managing used equipment for reuse is fully consistent with the requirements of the Basel Convention and establishes important documentation and assurance mechanisms that go beyond the obligations set forth in the Convention. Many governments have voiced concern over the transboundary movement of e-waste for materials recovery under the guise of repair or reuse. The Standard includes measures aimed at ensuring that shipments of used equipment for reuse or repair are legitimate and environmentally sound. While the approach of individual governments may vary, the Standard takes a practical approach to promoting the responsible reuse of equipment and components even as governments continue to debate the need for additional controls and transparency requirements for such shipments at the international level.

- Equipment and Components that are Fully Functional. Tested and “fully functional” equipment that is ready for use out of the box is not subject to international waste controls under the Basel Convention. As a treaty governing the transboundary movement of “hazardous waste” destined for materials recovery or final disposal, the export of functioning used equipment is clearly outside the scope of the Convention. Nonetheless, the R2:2013 Standard mandates specific testing, quality assurance and product return requirements that will reduce the risk of improper movements of end-of-life equipment and components. These requirements apply regardless of where the equipment is managed or, if it is being exported, the country of export.
- Equipment Tested for Key Functions. The R2:2013 Standard imposes similar requirements and documentation on proposed shipments of used products for resale that are tested for “Key Functions.” The R2:2013 Standard requires recyclers shipping equipment and components that contain Focus Materials to implement and document test methods confirming that “Key Functions” of the equipment or components are working properly, disclose to buyers the functions that are not working properly and describe the

condition of the equipment, implement a Product Return Plan and policy and ensure the equipment and components meet the specifications of the recipient vendor or end user.

- At the international level, governments have yet to adopt final guidance under the Basel Convention on the question of how the functionality of a used product is to be defined for purposes of demonstrating legitimate reuse. The proposed definition in the pending draft Technical Guidelines on E-waste (slated for possible adoption in 2015) focuses on “essential key functions” which are defined as “the originally intended function(s) of a unit of equipment that will satisfactorily enable the equipment to be reused.”
- This current definition in draft Basel Technical Guidelines is comparable to the current R2:2013 Standard’s focus on Key Functions: “*‘Key Functions’ are the originally-intended functions of a unit of equipment or component, or a subset thereof, that will satisfactorily serve the purpose(s) of someone who will use the unit.*”
- The R2:2013 Standard is also in line with the approach for determining functionality reflected in the recently released European Union WEEE Recast.⁶
- Evaluated and Non-Functioning Equipment. Finally, even with regard to the management of equipment that is non-functioning but suitable and intended for repair, the R2:2013 Standard again imposes documentation, tracking, recordkeeping and auditing requirements to ensure that such shipments are for legitimate repair rather than materials recovery.
 - As a general matter, used equipment destined for legitimate reuse, including reuse following repair or refurbishment, does not qualify as a waste under the Convention.⁷ While many governments support the movement of used products for legitimate repair and refurbishment as “non-wastes”, others have expressed

⁶ WEEE Directive 2012/19/EU (“Functionality shall be tested...[f]or most of the used EEE a functionality test of the key functions is sufficient.”).

⁷ The Convention defines “waste” as substances or objects which are disposed of or required to be disposed of by the provisions of national law (disposal is further defined by reference to Annex IV of the Convention and includes activities that lead to either final disposal or recycling/materials recovery). Equipment managed for repair and reuse would not be expected to qualify as a waste in most instances.

Annex IX of the Convention also recognizes that electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse (including reuse following repair or refurbishment) and not for recycling or final disposal are not subject to the Convention’s controls on hazardous wastes. Basel Convention Annex XI, Waste Entry B1110 and notes. The Convention notes that some countries do not regard materials or equipment destined for direct reuse to be wastes. Id.

concerns with the potential for illegal or undocumented movement of e-waste for materials recovery under the guise of repair.

- The parties to the Basel Convention are currently negotiating whether to adopt a new and more expansive reading of the Convention to control certain transboundary movements of used equipment destined for repair or refurbishment, although currently there is no consensus on an approach and negotiations are expected to continue well into 2015.
- Among the concerns raised is that new restrictions on legitimate shipments for repair could have the unintended consequence of accelerating the generation of e-waste by prematurely diverting reusable equipment to recycling rather than repair and continued use.

R2 Solutions is actively following these negotiations and related national developments and will consider the need for additional measures should governments agree on the need for new approaches to managing used equipment destined for repair and reuse.

Question: How does the R2:2013 Standard help recyclers ensure that any e-wastes classified as hazardous are managed in an environmentally sound manner?

Answer: The R2:2013 Standard requires extensive due diligence of downstream recycling vendors to ensure the safe and environmentally sound recovery of Focus Materials or equipment containing Focus Materials.

Under the R2:2013 Standard, certified recyclers must demonstrate that Focus Materials or equipment containing Focus Materials are only sent to processing, recovery or treatment facilities that meet all applicable regulatory requirements. Consistent with the Basel Convention and other national laws requiring “environmentally sound management” of hazardous wastes, the Standard mandates specific handling methods that must be followed and others that must be avoided to conform to the Standard. Management for energy recovery, incineration, and land disposal are expressly prohibited even though such practices may be allowed under national law and the Basel Convention.

The Standard includes a set of robust requirements for the use of downstream vendors handling Focus Materials that are designed to ensure down-stream facilities properly manage these materials down the Recycling Chain. These include measures that require the use of downstream vendors that:

- Conform to the Recycler’s Focus Materials Management Plan (which specifies the use of certain management measures while prohibiting others);
- Adhere to a documented system to manage environmental, health and safety risks and legal requirements;
- Comply with all applicable environmental and health and safety legal requirements and maintain a list and copies of current environmental permits;

- In turn apply the R2:2013 Standard’s criteria for selecting downstream vendors to its own relevant downstream vendors in the Recycling Chain; and
- Conform to the Standard’s requirements for equipment reuse, tracking throughput to document the flow of Focus Materials down the Recycling Chain and related security provisions.

In addition, an R2:2013 electronics recycler must at least annually, through an audit or similarly effective means, ensure that downstream vendors continue to meet the requirements for managing Focus Materials or equipment containing Focus Materials.

Question: Does the R2:2013 Standard include adequate worker health and safety protections?

Answer: Yes. The R2:2013 Standard mandates that an electronics recycler possess and use an Environmental, Health and Safety Management System (“EHSMS”) and that the management system be certified to an accredited management system standard.

The R2:2013 Standard mandates that an electronics recycler possess and use an EHSMS and that the management system be certified to an accredited management system standard (e.g., RIOS or a combination of both ISO 14001 and OHSAS 18001). The ISO and OHSAS certification bodies lack a single standard appropriate to fully certify an EHSMS at an electronics recycling facility. The Institute of Scrap Recycling Industries (“ISRI”) responded by developing the Recycling Industry Operating Standards (“RIOS”), which incorporate the industry-relevant EHSMS elements found in the ISO 9001 (quality), ISO 14001 (environment) and OHSAS 19001 (health and safety) standards, while eliminating the overlap that would occur if all three standards were adopted. The RIOS standard is based on the plan-check-do-act model for continual improvement that forms the basis of the ISO 9001 standard. Rather than incorporate parts of three different standards, scrap recyclers save time and money by adopting the single RIOS standard. R2 approved RIOS to certify EHSMS for purposes of its R2:2013 Standard.

In addition, the Standard requires all recycling facilities to abide by applicable health and safety laws. This includes implementation of appropriate ventilation engineering controls and the development of facility-specific occupational health and safety risk assessments. Additionally, many of the health and safety measures required by the R2:2013 Standard go over and above measures that may be required by applicable laws. For example, the Standard requires the implementation of engineering controls including, where appropriate, dust control and capture, and ventilation controls. The Standard also requires a facility-specific identification and assessment of occupational health and safety and environmental risks, including risks associated with exposures to substances. Indeed, the Standard notes that such facility assessments should take into account the unique risks posed by exposure to substances in the recycling industry and lists substances of note (e.g., mercury, lead, beryllium, cadmium, and

PCBs). All of these requirements are in addition to blanket protections recommended under the Standard, including safe work practices and medical surveillance.⁸

⁸ Health and safety laws in many jurisdictions contain air exposure and monitoring requirements in workplace settings. See the website for the [European Agency for Safety and Health at Work](#) for one compilation of materials on this subject, for both EU and non-EU jurisdictions.